Amendments to the Claims:

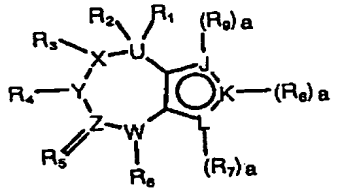
This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-23 (cancelled)

Claim 24. (original) A method of treating a viral, bacterial, fungal or parasitic infection in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said treatment, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the formula II

Formula II



wherein:

R_1 and R_2 are each independently selected from H, OR_3, SR_3, NHR_3, CO_2R_3, $CONHR_3$, and $CONHNHR_3$, CH_2OR_3, CH_2NHR_3, and CH_2R_3;

R_3, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_5 is selected from the group consisting of O, S and NH; and

R_7, R_8 and R_9 each are independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2'3'-dideoxy-2'-fluororiboxyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2',3'-difluororiboxyl, and mono-, di- and triphosphate derivatives thereof; and

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from the group consisting of:

H, H_2, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral form and stereoisomers of said compounds.

Claim 25. (original) The method of claim 24 wherein said infection is a virus infection.

Claim 26. (original) The method of claim 24 wherein said viral infection is caused by a virus selected from the group consisting of human immunodeficiency virus, Human B lymphotropic virus, Herpes simplex virus,

Varicella-zoster virus, Epstein-Barr virus, necrotic rhinitis, Malignant catarrh, Allerton virus, Equine herpesviruses, Neurolymphomatosis, Influenza viruses, Parainfluenza viruses, Adenoviruses, Rheovirus, Respiratory syncytial virus, Rhinoviruses, Coxsackie virus, Echo viruses, Epidemic gastroenteritis virus, Rubeola virus, Hepatitis viruses, cytomegalovirus virus and Papovavirus.

Claim 27. (original) The method of claim 24 wherein said viral infection is caused by Hepatitis viruses.

Claim 28. (original) The method of claim 24 wherein said viral infection is caused by Hepatitis B virus.

Claim 29. (original) The method of claim 24 wherein said viral infection is caused by Epstein-Barr virus.

Claim 30. (original) The method of claim 24 wherein said viral infection is caused by cytomegalovirus virus.

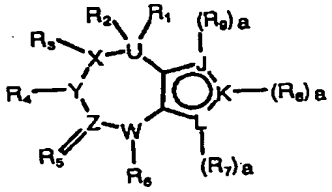
Claim 31. (original) The method of claim 24 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 32. (original) The method of claim 24 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

Claim 33 (original) The method of claim 24 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 34. (original) A method of inhibiting the growth of cancer in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the formula II

Formula II



wherein:

R_1 and R_2 are each independently selected from H, OR_3, SR_3, NHR_3, CO_2R_3, $CONHR_3$, and $CONHNHR_3$, CH_2OR_3, CH_2NHR_3, and CH_2R_3;

R_3, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_5 is selected from the group consisting of O, S and NH; and

R_7, R_8 and R_9 each are independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2'3'-dideoxy-2'-fluororiboxyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2',3'-difluororiboxyl, and mono-, di- and triphosphate derivatives thereof; and

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from the group consisting of:

H, H_2, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral form and stereoisomers of said compounds.

Claim 35. (original) The method of claim 34 wherein said cancer is selected from the group consisting of leukemia, non-small cell lung cancer, colon

cancer, CNS cancer, melanoma, ovarian cancer, renal cancer, prostate cancer and breast cancer.

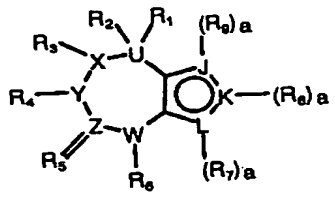
Claim 36. (original) The method of claim 34 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 37. (original) The method of claim 34 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

Claim 38 (original) The method of claim 34 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 39. (original) A method of inhibiting enzymatic activity of RNA polymerases in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the formula II

Formula II



wherein:

R_1 and R_2 are each independently selected from H, OR_3, SR_3, NHR_3, CO_2R_3, $CONHR_3$, and $CONHNHR_3$, CH_2OR_3, CH_2NHR_3, and CH_2R_3;

R_3, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_5 is selected from the group consisting of O, S and NH; and

R_7, R_8 and R_9 each are independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2'3'-dideoxy-2'-fluororiboxyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2',3'-difluororiboxyl, and mono-, di- and triphosphate derivatives thereof; and

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from the group consisting of:

H, H_2, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral form and stereoisomers of said compounds.

Claim 40. (original) The method of claim 39 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

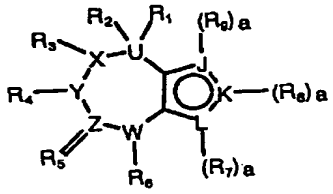
Claim 41. (original) The method of claim 39 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

Claim 42. (original) The method of claim 39 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 43. (original) A method of inhibiting enzymatic activity of adenosine deaminase and guanine deaminase in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-

planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the formula II

Formula II



wherein:

R_1 and R_2 are each independently selected from H, OR_3, SR_3, NHR_3, CO_2R_3, $CONHR_3$, and $CONHNHR_3$, CH_2OR_3, CH_2NHR_3, and CH_2R_3;

R_3, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_5 is selected from the group consisting of O, S and NH; and

R_7, R_8 and R_9 each are independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2'3'-dideoxy-2'-fluororiboxyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2',3'-difluororiboxyl, and mono-, di- and triphosphate derivatives thereof; and

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from the group consisting of:

H, H_2, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral form and stereoisomers of said compounds.

Claim 44. (original) The method of claim 43 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

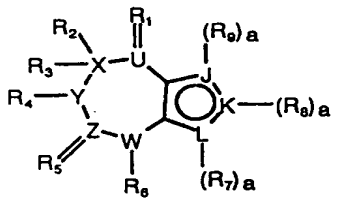
Claim 45. (original) The method of claim 43 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

Claim 46 (original) The method of claim 43 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

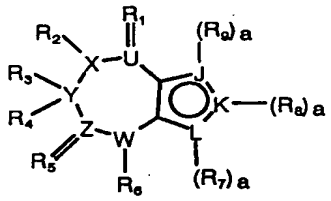
Claim 47. (original) A method of treating a viral, bacterial, fungal or parasitic infection in a patient or vertebrate animal comprising administering to

said patient or vertebrate animal in an amount sufficient to effect said treatment, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the following formulas III and IV

Formula III



Formula IV



wherein:

R_1 and R_5 are each independently selected from O, S, and NH;

R_3 and R_4 are each independently selected from H, OR_2, SR_2, NHR_2, CO_2R_2, $CONHR_2$, $CONHNHR_2$, CH_2OR_2, CH_2NHR_2, and CH_2R_2;

R_2, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_7, R_8, and R_9 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2',3'-dideoxy-2'-fluororibosyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2'3'-difluororibosyl, and mono-, di-, and triphosphate derivatives thereof;

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from:

hydrogen, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral forms and stereoisomers of said compounds.

Claim 48. (original) The method of claim 47 wherein said infection is a virus infection.

Claim 49. (original) The method of claim 47 wherein said viral infection is caused by a virus selected from the group consisting of human immunodeficiency virus, Human B lymphotropic virus, Herpes simplex virus, Varicella-zoster virus, Epstein-Barr virus, necrotic rhinitis, Malignant catarrh, Allerton virus, Equine herpesviruses, Neurolymphomatosis, Influenza viruses, Parainfluenza viruses, Adenoviruses, Rheovirus, Respiratory syncytial virus, Rhinoviruses, Coxsackie virus, Echo viruses, Epidemic gastroenteritis virus, Rubeola virus, Hepatitis viruses, cytomegalovirus virus and Papovavirus.

Claim 50. (original) The method of claim 47 wherein said viral infection is caused by Hepatitis viruses.

Claim 51. (original) The method of claim 47 wherein said viral infection is caused by Hepatitis B virus.

Claim 52. (original) The method of claim 47 wherein said viral infection is caused by Epstein-Barr virus.

Claim 53. (original) The method of claim 47 wherein said viral infection is caused by cytomegalovirus virus.

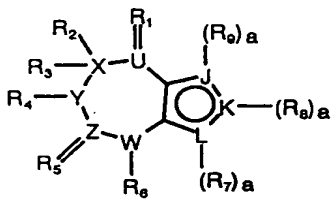
Claim 54. (original) The method of claim 47 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 55. (original) The method of claim 47 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

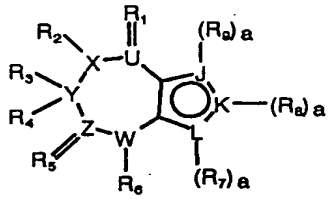
Claim 56. (original) The method of claim 47 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 57. (original) A method of inhibiting the growth of cancer in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the following formulas III and IV

Formula III



Formula IV



wherein:

R_1 and R_5 are each independently selected from O, S, and NH;

R_3 and R_4 are each independently selected from H, OR_2, SR_2, NHR_2, CO_2R_2, $CONHR_2$, $CONHNHR_2$, CH_2OR_2, CH_2NHR_2, and CH_2R_2;

R_2, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_7, R_8, and R_9 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2',3'-dideoxy-2'-fluororibosyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2'3'-difluororibosyl, and mono-, di-, and triphosphate derivatives thereof;

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from:

hydrogen, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral forms and stereoisomers of said compounds.

Claim 58. (original) The method of claim 57 wherein said cancer is selected from the group consisting of leukemia, non-small cell lung cancer, colon cancer, CNS cancer, melanoma, ovarian cancer, renal cancer, prostate cancer and breast cancer.

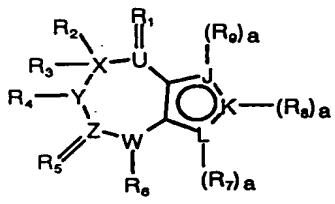
Claim 59. (original) The method of claim 57 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 60. (original) The method of claim 57 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

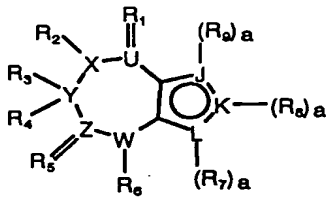
Claim 61. (original) The method of claim 57 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 62. (original) A method of inhibiting enzymatic activity of RNA polymerases in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the following formulas III and IV

Formula III



Formula IV



wherein:

R_1 and R_5 are each independently selected from O, S, and NH;

R_3 and R_4 are each independently selected from H, OR_2, SR_2, NHR_2, CO_2R_2, $CONHR_2$, $CONHNHR_2$, CH_2OR_2, CH_2NHR_2, and CH_2R_2;

R_2, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_7, R_8, and R_9 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2',3'-dideoxy-2'-fluororibosyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2'3'-difluororibosyl, and mono-, di-, and triphosphate derivatives thereof;

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from:

hydrogen, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral forms and stereoisomers of said compounds.

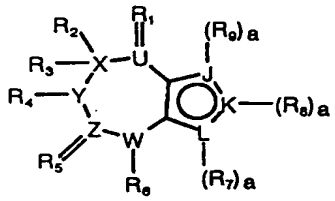
Claim 63. (original) The method of claim 62 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 64. (original) The method of claim 62 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

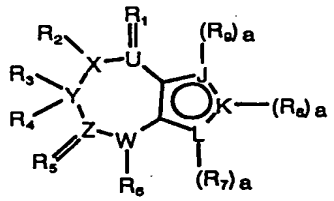
Claim 65. (original) The method of claim 62 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claim 66. (original) A method of inhibiting enzymatic activity of adenosine deaminase and guanine deaminase in a patient or vertebrate animal comprising administering to said patient or vertebrate animal in an amount sufficient to effect said inhibition, at least one of compounds comprising non-planar, non-aromatic, ring-expanded heterocyclic bases, nucleosides or nucleotides having the following formulas III and IV

Formula III



Formula IV



wherein:

R_1 and R_5 are each independently selected from O, S, and NH;

R_3 and R_4 are each independently selected from H, OR_2, SR_2, NHR_2, CO_2R_2, $CONHR_2$, $CONHNHR_2$, CH_2OR_2, CH_2NHR_2, and CH_2R_2;

R_2, R_4 and R_6 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the group have the meanings given above;

R_7, R_8, and R_9 are each independently selected from:

hydrogen, a C_1-C_{20} alkyl group, an aryl group which is a substituted or unsubstituted phenyl or heterocyclic group, and an aralkyl group wherein the aryl and alkyl portions of the groups have the meanings given above;

a glycosyl group wherein said glycosyl group is selected from the group consisting of ribosyl, 2'-deoxyribosyl, 2'3'-dideoxy-3'-azidoribosyl, 2',3'-dideoxy-2'-fluororibosyl, 2',3'-dideoxy-3'-fluororibosyl, 2',3'-dideoxy-2'3'-difluororibosyl, and mono-, di-, and triphosphate derivatives thereof;

$(CH_2)_m$-XR'-$(CH_2)_n$-YR' wherein R' is selected from:

hydrogen, H_2PO_3, $H_3P_2O_6$, $H_4P_3O_9$, and alkali metal or alkaline earth metal salts thereof;

m is zero to 20, n is zero to 20, and a is zero or one;

U, X, Y, Z, W, J, K, and L are selected from the group consisting of C, N, O, P, and S;

and all chiral forms and stereoisomers of said compounds.

Claim 67. (original) The method of claim 66 wherein said compound is administered subcutaneously, intravenously, intramuscularly, intraperitoneally, orally, topically, or by a combination thereof.

Claim 68. (original) The method of claim 66 wherein said at least one compound is administered in combination with at least one known therapeutic agent.

Claim 69. (original) The method of claim 66 wherein said compound is in a therapeutic form of a pharmaceutically acceptable salt, phosphonate, ester or salt of said ester, which provides said compound or its therapeutically effective metabolite during said treatment.

Claims 70-77 (cancelled)